

DOCUMENT RESUME

ED 274 568

SO 017 514

AUTHOR Zicht, Barbara, Ed.; And Others
 TITLE Externalities.
 INSTITUTION Lesley Coll., Cambridge, Mass. National Center of
 Economic Education for Children.
 SPONS AGENCY Joint Council on Economic Education, New York,
 N.Y.
 PUB DATE 82
 NOTE 10p.
 AVAILABLE FROM Joint Council on Economic Education, 2 Park Avenue,
 New York, NY 10016 (\$15.00 per year, 3 issues).
 PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052)
 -- Collected Works - Serials (022)
 JOURNAL CIT Elementary Economist; v3 n4 1981-82
 EDRS PRICE MF01/PC01 Plus Postage.
 DESCRIPTORS Activity Units; Concept Teaching; *Costs; *Economic
 Factors; *Economics Education; Elementary Education;
 Experiential Learning; Government Role; Learning
 Activities; Political Science; Problem Solving;
 Public Facilities; Services; Taxes

ABSTRACT

This issue explains the concept of externalities (benefits or burdens which accrue to society when there is a difference between the private cost or benefit of an action and the social cost or benefit of that action). These external or social costs of individual actions are often referred to as spillover costs. Three brief teaching units follow the introduction. The grade K-2 unit, "Spillover Detectives," provides activities which require children to identify and investigate examples of both positive and negative externalities. The grade 3-4 unit, "Exploring Externalities," uses decision making, problem solving, and a case study approach to explore the concept of externality. "Consider the Costs," the 5th and 6th grade level unit, provides 3 teaching activities which have students examine negative and positive externalities. (JDH)

 * Reproductions supplied by EDRS are the best that can be made *
 * from the original document. *

ED274568

THEME: EXTERNALITIES
THE ELEMENTARY ECONOMIST
VOLUME 3, NO.4
1982

EDITED BY
BARBARA ZICHT
ELEANOR SABINI
KATHRYN FURLONG

THE NATIONAL CENTER OF ECONOMIC EDUCATION FOR CHILDREN
AT LESLEY COLLEGE
CAMBRIDGE, MA 02238

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☒ This document has been reproduced as
received from the person or organization
originating it.
☐ Minor changes have been made to improve
reproduction quality.

* Points of view or opinions stated in this docu-
ment do not necessarily represent official
OERI position or policy.

BEST COPY AVAILABLE

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

PATRICIA K.
ELDER

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

300175-14

The Elementary Economist[©]

Vol. 3, No. 4

The National Center of Economic Education for Children

THEME: EXTERNALITIES

IN THIS ISSUE:

Teaching Activities

K-2: Spillover Detectives

3-4: Exploring Externalities

5-6: Consider the Costs

Page 2

Page 4

Page 6

DIRECTIONS

By William B. Walstad

Dr. Walstad is Assistant Professor of economics and Director of the Center for Economic Education at the University of Missouri—St. Louis. He is the consulting economist and author of "Directions" for Volume 3 of The Elementary Economist.

Many economic concepts, such as supply, demand, markets, wages, profits, and productivity, are familiar to teachers and are discussed daily in the news media. Other economic concepts, such as *externality*, are not commonly referred to in the news. An understanding and application of the concept of *externality* can help elementary students gain new insight into economic relationships and develop an economic way of thinking. The concept was mentioned briefly in Volume 3, No. 3, of *The Elementary Economist* but it deserves special emphasis.

An *externality* is produced when all the costs and benefits of an economic decision are not directly associated with the individual making the decision. For example, when an individual purchases a motorcycle, the person pays the private cost, its dollar price, and receives the private benefits, the enjoyment and transportation value of the machine. There is, however, an external cost to the rest of society from the decision to purchase the motorcycle in the form of noise pollution. Similarly, when a child buys a candy bar, the child pays the 30-cent cost and receives the pleasure of consuming the treat. If, however, the child throws the wrapper on the sidewalk after leaving the store, there is an external cost imposed on society. When a person pays the private cost of taking a lifesaving course, not only does that person benefit, but also society by having another trained person capable of saving people. In this case, the private decision to take the lifesaving course has resulted in an external benefit being produced. *Externalities*, then, occur when there is a difference between the private cost and the social cost (the private cost + the external cost) of an action, or when there is a difference between the private benefits and the social benefits (private benefit + the external benefit) of an action. When no *externalities* are present, the private cost equals the social cost, or the private benefit equals the social benefit.

Externalities can be negative or positive, and everyday examples of both types can easily be identified. The noise pollution from a motorcycle or the litter from a candy-bar wrapper are examples of negative *externalities*. Cigar and cigarette smoke also impose an external cost on third parties who had no part in buying or selling the tobacco. When a paper mill produces newsprint and writing paper, an external cost is imposed on society (third parties) from the air pollution and waste water discharge into rivers. When a child goes to the library to read, the child pays the private cost in terms of the opportunity cost of time and may also impose an external cost on other people by talking too loudly. Negative *externalities* arise when there is a discrepancy between the social and private costs and when they impose external costs on third parties who are not involved in the original transaction.

In contrast, positive *externalities* provide external benefits (sometimes called spillover benefits) to third parties or society in general. When the owner of a dog pays to have it vaccinated, the owner benefits from the transaction and so do the other residents of the town (third parties) by receiving the external benefit of a reduced chance of contracting rabies even though they had no part in the original transaction. When a homeowner paints the house or landscapes the lawn, the homeowner benefits from the increased aesthetic and economic value of the house, and the neighbors receive external benefits from the improved appearance of the neighborhood even though they were not included in the decision making. Education also produces spillover benefits to society. Students and their parents may pay the cost of education and reap some benefits in the form of a better income, better quality of life, or the enjoyment of learning. Society also benefits from having a more literate citizen who may pay increased taxes and has the potential to make a more significant contribution to society.

Many of the *externalities* found in our everyday lives are fairly trivial and require no need for government (local, state, or federal) intervention to correct the problem caused by a transaction decision. For example, government action is rarely needed to correct the problem of waste created by leaves falling into one's yard from a neighbor's tree, the air pollution caused by a neighbor's outdoor barbecue grill, or the noise pollution from the periodic barking of a neighbor's dog. A certain amount of external cost is tolerated since the cost of government action is even greater. On the other hand, where the *externalities* are great, such as the chemical pollution from DDT use or the air pollution from automobiles, government action may be necessary to mitigate the third party effects created by the private decisions of buyers and sellers in the market.

How should government deal with the problem of *externalities*? In general, government wishes to restrict those actions producing serious negative *externalities* and to promote those actions which produce significant

K-2

SPILLOVER DETECTIVES

by Ted Hagen

Ted Hagen taught in the elementary grades of Hillsborough County (Tampa), Florida. He is currently the Coordinator for Economic Education, Hillsborough County; Associate Director, Center for Economic Education, University of South Florida, Tampa; and Project Coordinator for DECISION-OMICS, an individualized elementary economics curriculum developed at the University of South Florida.



Externalities

Economics is a basic part of children's daily lives both in the primary and the upper grades. Economic concepts are prevalent throughout the curriculum. Teachers can identify these concepts and provide time and materials to help children understand them. One concept found in the primary curriculum is external costs and benefits (*externalities*). It is unlikely that the economic term, *externalities*, will be found in the K-2 curriculum but the concept is there. The primary social studies curriculum usually deals extensively with communities, community helpers, and more generally with government, pollution, and taxes. In the primary grades the term *externalities* need not be taught since the term "spillover" serves as an appropriate synonym.

Spillover Costs: These costs result when some good or service is produced or consumed, but are not paid by the producer or consumer alone. Others help pay the costs.

Spillover Benefits: These benefits result when some good or service is produced or consumed, but are enjoyed by someone who does not pay for them directly.

Private Property: Property is owned by one person, a family, or a business.

Public Property: Property is owned by all the people (government).

Good: An item that can satisfy a human need or want. Something that can be touched.

Service: Work done for others that does not produce a good.

Goals

The students will:

1. Understand and be able to use the following vocabulary: spillover cost, spillover benefit, private property, public property, goods, and services.
2. Understand and be able to discuss the relationship between spillover cost and spillover benefits.
3. Understand and be able to complete independently the student activities provided with this lesson.

Teaching Activities

1. **Private and Public Property.** Provide students with an assortment of large color pictures from magazines that clearly show single examples of private or public property. Good examples would be: a private home, a fire station, a pleasure boat, and a Coast Guard patrol boat. Teachers may wish to mount and laminate these pictures for future use. Before class, prepare a bright bulletin board, divided into two sections and labeled: PRIVATE PROPERTY and PUBLIC PROPERTY. Allow the children to identify the property in their pictures as private or public and place it on the correct side of the bulletin board. Through discussion bring out the following ideas:
 - a. Children use both private and public property.
 - b. Public property serves everyone who needs or wants it.
 - c. Everyone pays for public property because it would be too expensive for families or individuals to provide all the public goods and services for themselves. For example: Could each family afford its own fire and police stations?
2. **Spillover Cost: Who Pays?** Cover a flannel board or bulletin board with pictures that represent some form of external cost. For example: noisy motorcycle, car with one headlight, trash on a street, a polluted stream, neglected neighborhoods, uncut lawns, etc. Help the children discover that all these things have spillover cost. Explain that whenever people pay for something that they do not benefit from, they are paying a spillover cost. Use an example from real life at school to show this: Take the class for a walk around the school grounds. Point out the discarded paper and trash. Discuss with the children how the grounds are cleaned. Finally ask, Who pays? (The person who consumed the product in the paper wrapper paid the private cost, but society paid an external cost in the form of litter.) Let one child at a time take a picture off the flannel board and explain what spillover cost may be involved. Let the child call on another student to answer, Who pays? (Those affected by the noise, pollution, etc., and those who clean it up — the government.)

To receive a free subscription to *The Elementary Economist*, please send us your name, home mailing address, name of school, and school system (printed or typed only).

3. **Reading and Math Spillovers.** Whenever possible point out the concept of spillover costs through stories in the children's basal readers or library books. Challenge the students to find examples of spillover cost in their reading and daily lives. Watch for opportunities to emphasize spillover cost in mathematics word problems. Many word problems at the primary level involve private cost for goods and services but seldom mention spillover costs. Ask the students, Who pays?

4. **Spillover Books.** Make spillover booklets. Allow the children to search old magazines for pictures which show examples of spillover cost. Paste the pictures in a booklet made with two or three sheets of paper. Use the booklets to write two- or three-line language experience records for the children. Have the students try to identify, Who pays?

5. **Smokey Spillovers.** Use health curriculum materials related to cigarette smoking to point out how people who don't smoke are subject to breathing smoke. Discuss: what effect smoking has on non-smokers; what non-smokers may be doing about it; any local laws that may have been passed to protect non-smokers; and who pays.

6. **Spillover Detectives.** Use class field trips to point out spillover cost. When planning a field trip, let several children volunteer to be "Spillover Detectives." Let them record as many situations as they can that involve some external cost. The teacher or an aide may help them. During the debriefing of the field trip, develop an experience chart based on what the detectives "found." Since many spillover costs are subtle, the teacher or aide will probably have to point out most of them. Once the students get the idea, however, they seem to find more and more external costs. Discuss who pays.

7. **Spillover Benefit: Who Benefits?** Discuss and make a chart or matrix of the kinds of transactions that lead to spillover benefits, such as vaccinations, chest x-rays, clean water supplies, pollution control devices, painting and house maintenance, lawn care. The DECISIONOMICS Activity Sheet can be used to initiate discussion. Remember that all cases of spillover benefits are not clear-cut. For example, a factory that pays for pollution control devices may or may not benefit from the purchase. However, people who live miles from the factory may benefit but may never know about the cost to the factory. Each example must be discussed to determine, Who benefits?

DIRECTIONS:

1. Discuss each statement.
2. Decide: Who pays? Who benefited?
3. Decide if any one else benefited.
4. Discuss spillover costs and benefits.



Statement	Who pays?	Who benefits?	Who else benefits?
1. Mr. Jones paints his house.			
2. Paul got a polio vaccination.			
3. Milford cleans the river water before it gets to Compton.			
4. Ace Tool Company puts in a clean-air filter.			
5. Tina finishes high school.			
6. Al mowed Mr. Fay's lawn.			
7. Tom's dog gets a rabies shot.			

8. **Beneficial Stories.** Use storytelling time to make language experience charts while encouraging the children to tell stories about how they benefit from what other people do. This is a good small-group activity. Each group is given a situation, such as, "George paints his house." The children then make up a story to show who benefits and why. Record some of the stories on cassette tape and play them to the class. Children should discuss, Who pays? Who benefits?

EXPLORING EXTERNALITIES

by Diane Reinke

Diane Reinke has taught elementary school in Osseo, Minnesota, and Early Childhood Education at Lakeland Community College, Mentor, Ohio. She has won state and national economic education awards and has written curricula in economic education for the primary grades.



Externalities

The concept of *externalities* demonstrates that economics truly is a behavioral science. Young people who understand the *externality* concept will be more thorough and effective decision makers. They will consider the benefits and costs not only to themselves but also to uninvolved third parties when making personal and societal decisions. People who follow this approach to decision making have developed an "economic way of thinking." The following series of activities will motivate, demonstrate, and apply the concept of *externalities* (spillover benefits or costs).

Goals

The students will:

1. Explain that every decision they make may have an effect on third parties (cost and/or benefit).
2. When given written stories, identify the cost and benefit effects on third parties.
3. Classify situations into spillover costs and benefits.
4. Find examples of *externalities* in their daily lives (using their own reasoning skills).

Teaching Activities

1. Noise Pollution

This activity provides motivation and an introduction to the concept of *externalities* (spillover costs and benefits).

Set the stage by creating a noisy learning environment. Set the volume high on a pocket radio or record player until students begin complaining. Tell students you like the loud noise and you are in charge of the audio equipment. When protests of unfair are heard, stop the "noise pollution" and discuss the

situation. Questions for discussion:

1. Why were you annoyed by the loud noise?
2. How did you feel about this situation?
3. How many students thought this was bad? Good?

The above situation is an example of an *externality* (spillover cost or benefit). To most students this was a negative *externality* (spillover cost). To some students it may have been a positive *externality* (spillover benefit). An *externality* occurs when a person (third party) is affected by someone else's decision. The person can be affected in a good or bad manner. They have no control over the situation that results in a cost or benefit to them. In the above situation, the students had no control over the noise level.

As a follow-up, have students list other types of noise pollution and related problems. Examples are freeway noise, airport noise, loud motorcycles, neighbors' loud stereos, neighbors' dogs barking, neighbor playing beautiful organ music. This could be done in small group sessions or as a class project.

2. Family Garden Problems

The following story exemplifies the concept that *externalities* consist of benefits and costs to third parties.

Read the following story to the class.

Once upon a time there was a family of rabbits. They lived in Susan's backyard. Susan's family decided to plant a garden. They all went to the backyard and decided on a perfect place for the garden. They were so excited and happy. Everyone began digging and clearing away the low bushes, rocks, and shrubs. Meanwhile the rabbit family had scampered away into the woods. The rabbits peeked out to see their home being destroyed by Susan and her family. How sad the rabbit family felt. They had no choice and could do nothing about their home. They found another home but it wasn't as nice as their first one. Every day they hopped by the garden. One day, little Randy Rabbit went into the garden to explore. He found tasty things like lettuce and carrots. Then he brought his whole family to enjoy the delicious food. Soon the lettuce and other vegetables were gone! Susan's family was angry at the rabbits for eating in their garden. One day Susan saw Randy Rabbit and chased him away.

Discuss the story with the students:

1. Who experienced a negative *externality* (spillover cost)? (The Rabbit family had to move because of the garden.)
2. Who experienced a positive *externality* (spillover benefit)? (The Rabbit family got to eat the lettuce and other vegetables.)

As a follow-up ask students to identify negative or positive *externalities* in their neighborhoods. They could assume the role of newspaper reporters on the lookout for positive or negative *externalities* (spill-

To receive a free subscription to *The Elementary Economist* ②, please send us your name, home mailing address, name of school, and school system (printed or typed only).

over benefits or costs). Examples are: Beautiful yards, piles of garbage, junked automobiles, graffiti, flower gardens, messy driveways. The students can develop a bulletin board from their neighborhood observations by drawing pictures of the situations they saw, and labeling the bulletin board, "We All Experience Externalities."

3. Rain Case Study

Ask the following questions of the students: Where does rain come from? What is rain? How much does rain cost us? What benefits does rain give? Do not expect accurate responses. These questions are designed to provoke thought and interest in the following activity. This activity reinforces science concepts and shows how economics can be an integral part of the basic school curriculum.

Demonstrate the following experiment on rain.

MATERIALS: Saucepan partially filled with boiling water. Lid of the pan or a plate.

PROCEDURE: Keep the water boiling in the saucepan and take the lid or the plate and hold it above and over the pan, but not on it.

OBSERVATION: First a thin film of steam covers the plate or lid, and when more steam rises, tiny drops of water form on the lid and fall back into the pan.

CONCLUSION: When water is heated, it evaporates and becomes steam. When it is cooled, it condenses and becomes water again. The water droplets are like rain that falls. There are many tiny drops of water up in a cloud. When these drops are cooled and get too heavy, they fall to the ground, and we get rain.

Sometimes the rain that falls to earth is dirty. Why do you suppose this happens? Let students hypothesize about this problem. The dirty rain is a result of polluted air. The polluted air comes from factories and automobiles. The dirty rain kills fish in lakes, makes people sick if they drink it, and corrodes buildings and statues.

Note: The dirty rain is called "acid rain." The main cause is sulfur dioxide, one of the things produced when coal is burned. U.S. industries spew out 25 million tons of sulfur dioxide each year, compared with the 2,000 tons that Mt. St. Helen's spat out in May 1980.

Discuss the following questions:

1. Who caused this problem? (Factories, Cars)
2. What externalities does it cause? (Sickness, Dirt)
3. What solutions do you think could be developed to stop this? (Pollution Regulations, Pollution Controls) What do these solutions cost? Who would pay? (Society, through taxes.)
4. Who bears the cost of dirty rain? (Everyone. It is a spillover cost.)

References: "Acid From the Skies," *Time*, p. 88, March 17, 1980. "Acid Rain: How Great a Menace?" *National Geographic*, pp. 652-681, November 1981.

4. Externality Worksheet

Have students read each situation below and decide if it is a positive or negative externality, or both.

Place a check mark in the appropriate box.

Situation	Benefit	Cost	Both
1. A girl talking loudly in the library.			
2. People trying to talk while a car passes blaring political advertising.			
3. A family plants roses in its frontyard.			
4. A person throws a candy wrapper on the ground.			
5. A person smokes in a crowded room.			
6. A boy has his dog vaccinated.			
7. A person plants an apple tree.			
8. A factory makes bicycles but also pollutes the air.			

Note to the teacher: These situations have been created to demonstrate all types of externalities. Allow students to be creative and go beyond the obvious answers to develop their insight into this concept.

5. Externality Poster

Divide the class into groups of 4 or 5 students. Have them discuss and choose an example of an externality in the school or home environment. Instruct the students to draw a representation of their externality on a poster. Have students label their posters and display them around the school building. Students should apply the knowledge and experience gained from previous activities.

6. Externality Simulation

Instruct students to plan an activity that would have a spillover benefit. The students should consider carefully their choice of activity. Have students share their positive externality with the class. This can be done through a story, picture, or oral presentation, whichever the students wish. The positive externality might be, for example, vaccinating a dog or cat, taking a lifesaving course, painting one's house, decorating a school bulletin board.

CONSIDER THE COSTS

by Abbejean Kehler

Abbejean Kehler is currently the Field Director for the Florida Council on Economic Education. She has taught economics at the college level and has worked with economic education programs in North Dakota, Kansas, Indiana, and Florida.



Externalities

External costs (spillover costs) and external benefits (spillover benefits) are a part of our everyday decision making. If these costs were not involved, solving problems would be easier. Students should be able to identify the difference between private benefits and costs, and external benefits and costs (*externalities*). Considering these *externalities* leads to hard choices for each of us as individuals and citizens. This unit presents situations in which these hard choices can be examined.

Goals

The students will:

1. Define and use correctly the following vocabulary: *externalities*, external benefits and cost, private benefits and cost, opportunity cost.
2. Identify the opportunity cost involved with choosing a particular solution to a problem.
3. Describe how regulation can help and hurt members of the community.

Teaching Activities

1. Identifying the spillover costs and benefits

A. Private Cost and Benefits

1. Have children give examples of consumer goods that they or their families have recently purchased (e.g., candy bar, automobile, computer game, etc.).
2. For each good purchased, ask the students the approximate cost in dollars.
3. Explain to the students that when an individual purchases a good, he/she is paying a private cost.
4. Now ask the students, Who benefits from the purchase of a consumer good? (The person who buys the good benefits, and if he/she shares the good with others, they also benefit.)

5. To summarize, explain to students that most goods and services purchased have *private* costs and benefits. Those who pay for the goods control their use and reap the benefits.

B. Spillover Costs

1. Have the students consider examples of spillover costs — a situation where a person pays the private cost and receives the private benefit, but where there are spillover costs (external costs) for other members of society.
2. Ask the students to identify private cost, private benefit, and spillover cost in the following three examples (create other examples to add to the list if you want to reinforce the concept).
 - a. Cindy buys a 35-cent candy bar, eats it, and throws the wrapper on the sidewalk outside of school. (Private cost is 35 cents; private benefit is the candy bar; spillover cost is the litter.)
 - b. Alan loves to listen to music and bought a stereo this summer for \$200. He likes to put the speakers in the open window of the house, turn up the volume, and boogie to the music on the patio. (Private cost is \$200; private benefit is the stereo; spillover cost is noise pollution.)
 - c. Dorothy loves dogs and bought a German Shepherd puppy for \$100. Each morning and afternoon she lets the dog out of her house to "do her business" which the dog does in the neighbors' yards. (Private cost is \$100; private benefit is the puppy; spillover cost is the mess on neighbors' lawns.)

C. Spillover Benefits

1. Explain to the children that sometimes people pay the private cost for a consumer good or service and receive some of the private benefits, but other people not directly known or related to the individual may also benefit.
2. Have students find the private cost, private benefit, and spillover benefits in the following situations:
 - a. Jimmy paid \$10 to have his dog vaccinated by his veterinarian. (Private cost is \$10; private benefit is a healthy dog; spillover benefit is a health safeguard to the neighborhood.)
 - b. Darlene paid \$15 to take a first-aid course at the local YWCA in order to get a summer camp job. She is always ready to help if her services are needed. (Private cost is \$15; private benefit is a summer job; spillover benefit is her ability to aid society.)
 - c. Sammy helped his father paint their house this summer and do some landscaping which cost \$1,000. Now the house is considered the "best looking in the neighborhood." (Private cost is \$1,000; private benefit is the improved house; spillover benefits are the

To receive a free subscription to *The Elementary Economist*®, please send us your name, home mailing address, name of school, and school system (printed or typed only).

improvement to the neighborhood and the increased property value of the neighbors' houses.)

2. Hard Choices

Introducing the concepts of taxation and subsidies is not difficult. These same concepts can be explored to demonstrate how they affect the amount of positive and negative *externalities* which exist. Ask your class to serve as environmental advisors to the city council. Remind them that the choice they make has an opportunity cost* and that the community environment is not only ecological but economic. The two scenarios you might present — two factories in the area have been emitting pollutants into the surrounding region. Students choose to subsidize or tax to alleviate the problem. They have been "hired" to make recommendations to the city council. Their decision-making process could follow the steps below:

	FACTORY A Dumps raw sewage	FACTORY B Smoke stacks emit pollutants
Council Action	Impose tax on factory; council will use tax to pay for cleanup.	Council subsidy to factory to enable them to buy scrubbers.
Price of Output	Increases	Stays the same
Amount of Goods Bought	Decreases	Stays the same (for a while)
Number of Workers	Decreases	Stays the same
Overall Effect	Fewer people working; less pollution; less output for people to buy.	No change in employment; less pollution. Same amount of output for people to buy.
Benefits	Cleaner environment	Cleaner environment
Costs	Fewer goods available; some lose their jobs.	Taxes must be collected to pay for subsidy. Eventually decreases in consumer purchases, decreases in employment. Result—same effect as tax over long run.

*When making a decision, the alternative given up when the choice is made is the opportunity cost.

Try to discuss some of the following aspects of taxing, subsidizing, and regulating strategies to solve pollution problems:

The decision to impose a tax or subsidy is a hard one. The town council may not be willing to impose too large a tax on the business lest it move to another town, resulting in a loss of jobs and tax revenues. These are political reasons not to impose the tax.

On the other hand, the town council may not want to subsidize the purchase of the pollution control equipment. The subsidy would raise tax expenditures in the town, and those citizens who receive no direct benefit from the factory might complain about tax dollars being used to support the business.

Other citizens will call for regulation of the business, but this solution has problems too. Regulations would have to be enforced by a newly hired inspector who would be paid with tax dollars. The business would have additional costs in order to conform to the new regulations. Regulations may also be less efficient than a tax or subsidy because stringent or outdated rules can prevent a business from meeting the regulation requirements in the most economical way.

3. Tic-Tac-Define

The vocabulary used to explain many of the concepts and terms of *externalities* is new. One way to reinforce new vocabulary is by a tic-tac-toe game. Cross hatch an 8 x 11 sheet of white paper like a tic-tac-toe board. Place this "blackline" between a cardboard and a clear acetate sheet of equal size. (Use two pieces of clear acetate for overhead projector use.) Fasten the top edges of the two with a strip of cloth tape or contact paper so that the blackline can easily be slipped in and out. Two large paper clips can be used to attach the paper to the bottom edge of your "magic slate." Felt tip markers or washable crayons can be used so the tic-tac-toe board is reusable. For this exercise your blackline may look like the following:

Private Benefit	Subsidy	Private cost
Opportunity Cost	Externality	Tax
External Benefit (Spillover Benefit)	Regulation	External cost (Spillover cost)

In order to play, the usual tic-tac-toe rules apply. To "capture" a square the student must correctly define the term in that square before making an X or O. Definition cards can be provided for this game or it can be used as a reinforcement test.

To receive a free subscription to *The Elementary Economist*®, please send us your name, home mailing address, name of school, and school system (printed or typed only).

(continued from page 9)

positive externalities. There are essentially three ways which have been used to accomplish these two general objectives.

The most common means to correct negative externalities are regulations. Many states have imposed laws which require smoking and non-smoking areas in public buildings and businesses in order to reduce the external cost from smoking borne by the non-smokers. Litter laws are designed to reduce the spillover costs from consuming goods by fining the violators. Zoning laws regulate land use for residential or commercial purposes to reduce the potential conflict between the homeowners and businesses over what constitutes an acceptable level of external cost. In a similar fashion, a teacher acts as a regulator in the classroom through rules and noise control to minimize the external costs imposed on other students from the actions of one student.

Another means of reducing external costs has been to impose a tax on the activity producing the externality. Taxing a good increases its price and reduces the quantity of the goods consumed, thereby achieving the desired objective. When taxes are imposed on specific consumption goods, they are referred to as excise taxes. Examples of excise taxes are those on tobacco, liquor, gasoline, and tires. While the excise tax does not eliminate consumption of the good and the production of the externality, it does reduce the amount of spillover costs compared to the no-tax situation.

The opposite of a tax is a subsidy which the government often uses when it wishes to promote the private actions that produce significant positive externalities. Education is an activity with many potential external benefits. To encourage people to educate themselves, our society has heavily subsidized education at the elementary, secondary, and college levels. Compulsory attendance (i.e., regulation) has been used with subsidies at the elementary and secondary levels to produce the desired effects. Subsidies are also used to reduce the private cost of vaccinations in many localities so that citizens will be encouraged to immunize their pets. Government and charitable organizations encourage people to become more knowledgeable about health and safety by subsidizing first aid courses in order to increase the external benefits from this type of instruction.

Regulation, taxation, and subsidization are three ways that government handles externality situations. Each of the strategies has strengths and weaknesses: regulations are easy to enact but difficult to enforce; taxes and subsidies offer more efficient solutions to some problems but are not politically popular. Consequently, there is continual debate over which type of strategy to use for each externality problem. A case in point is provided by the battle for bottle deposit bills in various states. Regulations were the first attempt at

controlling the litter problem, but now some states have required a tax to be paid on each non-returnable bottle (which should result in reduced production of non-returnable bottles).

Externalities frequently result from economic decisions. Externalities cannot be eliminated, nor should they be, for the opportunity cost would be too great. Consider what society would have to give up in order to achieve perfectly clean air: factories would be shut down and automobile travel severely restricted. Clearly, these solutions would be a ridiculous way to obtain clean air. What each society has to decide is how much of the negative externality it is willing to accept given the benefits from the goods producing the externality.

Similar reasoning applies to positive externalities, which society generally wishes to promote rather than restrict. There is, however, also an opportunity cost to be considered. If the subsidy to education or health, for example, is too large, then too many resources will be devoted to these activities resulting in overproduction and inefficient use of resources. Society must decide what it is willing to give up, as measured by the other desirable goods which could be obtained with the subsidy funds, to capture the benefits produced by the externality.

Each society must determine its optimal level of externalities. Elementary students can identify the externalities present in their world and, with some guidance from the teacher, begin to analyze the social problems and solutions created by individual decisions in the classroom and the marketplace.

Permission is hereby granted to reproduce in any quantity for classroom use in whole or in part any portion of this publication. For other uses please contact The National Center at Lesley College.

Editors:

Barbara Zicht
Eleanor Sabini
Kathryn Furlong

Designer: Barbara Wrenn

Layout Artist: Lee-Ann Larson

Published by The National Center of Economic Education for Children, Lesley College, Cambridge, MA 02238.
Phone: (617) 868-9600.